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REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Claims 40-61, 69 and 71-78 were rejected under 35 U.S.C. §112, first paragraph for allegedly failing to be enabling for only homolog and derivatives described in the specification.

It is respectfully submitted that the amendments to the claims render this rejection moot, as homologs and derivatives described in the specification at page 16, line 38 to page 17, line 31 are now recited in the claims and the term "substituted" no longer appears in claim 49.

The Examiner also alleged that the claims recite molecular weights with regard to the polymeric species (A)(i) without stating whether average molecular weight is intended and if so what type is intended. It is respectfully submitted that one of skill in the art would understand that average molecular weight is meant.

With regard to the glycols (A)(i) the person of skill in the art does not refer to the calculation of the average molecular weight but to the hydroxyl value of the starting materials in mg KOH/g from which the average molecular weight can be derived by calculation.

In view of the foregoing, it is respectfully submitted that all rejections under 35 U.S.C. §112, first paragraph should be withdrawn.

Claims 40-61, 69 and 71-78 were rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. With respect to item A, the Examiner is referred to the discussion of molecular weight above. It is believed that the amendments to the claims render the remaining rejections under §112, second paragraph moot.

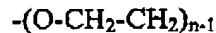
Claims 40-78 were rejected under 35 U.S.C. §102(b) for allegedly being anticipated by U.S. Patent No. 4,501,852 to Markusch et al., ("Markusch"). Applicants respectfully traverse.

The polyurethane dispersions according to the presently claimed invention are not disclosed in Markusch because according to the presently claimed process the specific

macromonomer (A)(ii) is used as a starting material which is hydrophilic and solvent-free due to its three-stage preparation process.

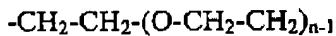
Furthermore, the Examiner alleges that the difunctional hydrophilic component of the formula (I) (cf. Markusch, column 7, line 26 falls within the scope of the macromonomer (A)(ii). Applicant respectfully disagrees.

First, the structural unit X in formula (I) (cf. column 7, line 62 to column 8, line 2) does not appear to be correctly described since a "polyalkylene oxide chain" does not have any terminal OH-groups. For example, a polyethylene oxide chain can be depicted as follows:



This molecule exemplifies polymeric ethylene oxide molecules without end groups which can also be characterized by the expression "polyalkylene oxide chain".

According to Markusch, X represents the radical obtained by removal of the terminal hydroxyl group from a polyalkylene oxide chain. However, such removal of the terminal hydroxyl group does not result in a polyalkylene oxide chain but in the following molecule:



For this reason, it is not even clear how the compound of formula (I) of Markusch is to be understood.

In particular, Markusch does not disclose that the component of (I) is prepared by a three-stage preparation process. The use of this process results in at least the following differences of the macromonomer (A)(ii) and the resulting polyurethane dispersion over Markus:

1. In contrast to the component (I) of Markusch the macromonomer (A)(ii) is essentially free from by-products due to the specific composition of the hydrophilic alkyl- and/or aryl polyalkylene glycol (A)(i), which is selective towards polysiocyanates.

2. The preparation process of the macromonomer (A)(ii) allows the full compatibility of all reactants and components, resulting in prevention of turbidity of the prepolymer and of the resulting dispersion film, respectively.

3. An optimum distribution of the non-ionic stabilizer (macromonomer (A)(ii)) in the polyurethane polymer is achieved.

4. The macromonomer (A)(ii) according to the invention differs from the examples disclosed in Markusch in that it is solvent-free. In contrast thereto, the prepolymers obtained according to Markusch contain N-methyl-pyrrolidone.

5. According to the Tables III, IV and V of Markusch the dispersions of Examples I to V of Markusch are less stable than the polyurethane dispersions according to the presently claimed invention.

6. The solids contents of the resulting dispersions disclosed in Markusch are between 35-39%. In contrast, the solids contents of the dispersions of the invention are $\geq 50\%$.

Consequently, Markusch neither discloses the hydrophilic and solvent-free macromonomer (A)(ii) nor the polyurethane dispersion which is prepared by this starting material.

In view of the foregoing withdrawal of the §102(b) rejection is respectfully requested.

Claims 40-78 were rejected under 35 U.S.C. §103(a) for allegedly being unpatentable over Markusch. Applicants respectfully traverse.

Differences between Markusch and the presently pending claims are discussed above.

In addition, Markusch does not provide any hint or suggestion to the skilled artisan that the use of a hydrophilic and solvent-free macromonomer (A)(ii) for the preparation of a polyurethane dispersion brings about many advantages. In particular, Markusch does not

disclose or suggest that the prepolymer (A)(ii) should be prepared by a three-stage preparation process.

It has been found that through the preparation and use of a hydrophilic and solvent-free macromonomer (A)(ii) with a molecular mass distribution in accordance with reaction stages a₁, a₂ in conjunction with a three-stage preparation process for the polyurethane prepolymer in accordance with reaction stages b₁) to b₃) the following advantages for the obtained polyurethane dispersions of the invention result:

no byproducts during the preparation of the macromonomer (A)(ii), owing to the specific composition of the hydrophilic alkyl- and/or arylpolyalkylene glycol (A)(i), which is selective toward polyisocyanates;

compatibility between nonionic stabilizer (macromonomer (A)(ii)) and polyurethane backbone even during the synthesis of the polyurethane prepolymer;

optimum arrangement/distribution of the nonionic stabilizer (macromonomer (A)(ii)) in the polyurethane polymer as a result of a three-stage preparation process for the polyurethane prepolymer;

overall very low stabilizer requirement (anionic+nonionic) and comparatively very low hydrophilicity;

no coagulation at pH 1-14;

true dispersion: high solids contents at low viscosity, owing to very low stabilizer requirement (anionic+nonionic) (cf. prior art: solutions: high viscosities at high solids contents, owing to very high stabilizer requirement);

completely VOC-free binders are obtainable;

high long-term storage stability (cf. prior art: slow destabilization as a result of byproducts in nonionic stabilizers);

resistance to hydrolysis, and low-temperature flexibility, in comparison with acrylate-based binders for similar applications;

profile of properties, material properties, and processing characteristics are influenced positively as a result of innovative polymer structure.

In view of the foregoing, withdrawal of this rejection is respectfully requested.

All issues raised by the Examiner have been addressed, therefore, allowance is respectfully requested.

The Commissioner is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 50-0624, under Order No. NY-HUBR-1286-US. A duplicate copy of this paper is enclosed.

Respectfully submitted

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